Preparation and Characterization of Anisotropic Films by Curing Hard Silicone Microspheres with Soft Silicone

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Preparation and Characterization of Anisotropic Films by Curing Hard Silicone Microspheres with Soft Silicone

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Poly(dimethylsiloxanes) (PDMS) have unique properties such as elastic behaviour and resistance to high temperatures, light degradation and chemical attack.[1] These exceptional features make cross-linked PDMS suitable for a wide range of applications such as in electrical and/or optical devices [2], anticorrosion [3], sealants and adhesives [4] and biomedical applications [5]. Furthermore an elastomer is a crosslinked polymeric material with the capacity of going back to its original size and shape after being deformed. The aim of this work is to prepare anisotropic silicone materials by curing hard silicone microspheres with soft silicone **(Fig.1)** and studying the effects of hard silicone microspheres on the properties of polysiloxane elastomer. **(Fig.2)**

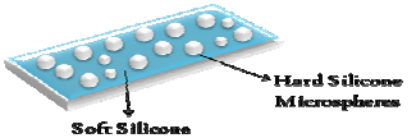

Figure 1. Soft silicone film with hard silicone microspheres

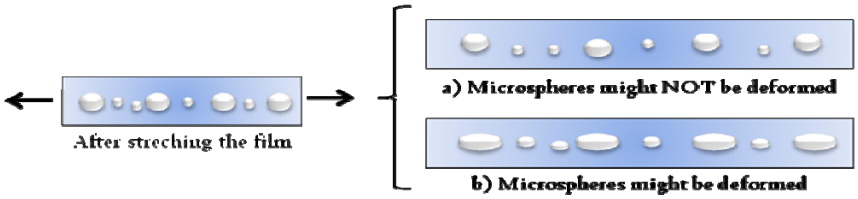

Figure 2. Behaviour of the film after stretching.

The films were prepared by curing two silicone systems: the hard silicone microspheres, which are prepared by using Sylgard 184, a common PDMS elastomer kit from Dow Corning, and the soft silicone that is based on vinyl terminated PDMS (DMS-V35 with Mn=49500 g/mol). The analysed parameters, which directly influence the properties of the films, are: a) excess of vinyl groups in hard microspheres, b) size distribution of microspheres and c) excess of hydride groups ($r > 1$, where r is defined as the stoichometric imbalance). Finally, the films were characterized by rheological (dynamic viscoelastic) properties and extensional experiments.

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